Organizational turnover as endogenous precursor of industry dynamics and organizational dissolution

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ABSTRACT

This paper studies the effect of organizational turnover on firm survival within the Dutch accounting service industry during the period 1880-1986. We address three issues: (1) estimating the effect of organizational turnover on organizational dissolution; (2) showing the significance of propinquity in isolating that effect; (3) exposing population dynamics through different levels of analysis. The results of our analysis confirm that turnover is an important endogenous force shaping the evolution of localized populations of organizations. The risk of organizational dissolution increases when turnover entails losses of human and social capital (e.g. long-term owners) and disruption of organizational routines. The results also show that such risk is even higher when organizational members join a competitor or found a new venture within the same geographical area.

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INTRODUCTION

Turnover has been shown to have important implications for organizational performance. It has been long recognized to affect processes of organizational learning and unlearning (e.g. Levitt and March, 1988; Argote and Ophir, 2002). Although some authors (March, 1991; Simon, 1991) have stressed how firms can enhance innovation and creativity by replacing old members with new ones, turnover often triggers internal disruptions that raise the risk of firm dissolution. The exit of organizational members may in fact unravel the smooth functioning of existing routines (see Rao and Drazin, 2002; Sørensen, 2001). Furthermore, it also undermines performance especially when a firm loses valuable human and social capital to rival firms.

A good deal of work on organizational turnover has been oriented to teams, most commonly top management teams and their CEOs (e.g. Castanias and Helfat, 1991), and to the impact on the moving member's performance (e.g. Groysberg and Nanda, 2001; Harris and Helfat, 1997). Yet, while the interest in the effect of organizational turnover on firm performance is clearly increasing, much of the work to date has been devoid of empirical tests. Furthermore, quite surprisingly there is only "little published research directly linking personnel flows to population level processes" (Wade et al., 1999: 136).

To this end, the purpose of this paper is twofold. First, we examine the effect of organizational turnover on firm performance. Second, while inter-firm mobility often involves two firms, the donor and recipient firms, the effects of such inter-firm transfer have never been explicitly addressed. The effects might take on a rather different significance depending on whether or not the two firms are competitively interdependent, like when they operate within the same geographically proximate environment. Thus, drawing on the recent findings of research on spatial heterogeneity (e.g. Greve, 2000) we advance this line of inquiry investigating whether the disruptive effects of organizational turnover are most pronounced under conditions of propinquity.

Such inquiry leads us to explore the link between micro- (i.e., individual) and macro-level (i.e., organization, population) phenomena and illustrate their interaction in shaping the evolution of the industry. We analyze data on the entire population of Dutch accounting firms during the period 1880-1986. The longitudinal character of the study allows tracking such effects as they unfold over time. We also believe the service industry to represent an ideal setting to study the effects of organizational turnover on firm dissolution for at least two reasons. First, the departure of professionals – especially partners (i.e., the owners of the firm) – has important implications for the functioning

and often even the survival of an organization. Second, since the relationships between professionals and clients tend to be local, the industry is highly suitable for testing spatial heterogeneity hypotheses.

THEORY

The theoretical framework underpinning our analysis has been mapped out in Figure 1. We distinguish between two causal pathways between turnover and organizational dissolution: a direct and indirect path. Turnover affects odds of survival directly as departure of organizational members harms the firm's integrity of complementary and shared routines. This accords with theoretical reasoning (Hannan and Freeman, 1984) and some empirical evidence (e.g., Rao and Drazin, 2002).

We also assume an indirect effect because turnover alters the firm's competitive context. The implicit loss of human (individual skills and knowledge) and social (relation with clients) capital influences organizational performance and survival when organizational members join another firm or start a new venture. In the latter case density – and competition for scarce resources alike – increases in the geographical area in which a new firm is founded. The effect of turnover is 'indirect' because its impact on organizational dissolution is conditional on the increase in competitive pressures.

The overall effect of organizational turnover – both direct and indirect – is moderated by the status of the defecting organizational members, local experience at the firm level and the influence of locational factors (spatial heterogeneity). The departure of members carrying valuable human and social capital – like owners (ex: partners in service accounting firms) and other key individuals – is deemed to be more harmful than the departure of less critical members. Thus, a firm's dissolution increases (1) when turnover involves partners; and (2) when those who left joined a competitor or founded a new firm located in the focal firm's vicinity. In the next two sections we further elaborate on these points.

Figure 1 about here

The Individual and the Organization

Organizational turnover undermines the long-term viability of a firm when the exodus of individuals translates into a loss of valuable human capital. The resource-based view of the firm, for instance, has pointed to intangible assets as the foundation of a firm's advantage so long as these assets are rare, difficult to imitate and substitute, and non-tradeable on the market (Wernerfelt, 1984; Barney, 1986 and 1991; Dierickx and Cool,

1989). As individuals are the repositories of a firm's knowledge, organizational turnover can raise the risk of organizational dissolution in industries where the control over knowledge-based resources is crucial. Not surprisingly, existing firms often acquire new knowledge by 'poaching' skilled individuals from peer firms (Flides, 1990; Baum and Ingram, 1998). Furthermore, existing routines or established social relationships inside and outside the organization are often irreversibly altered and disrupted as well. An organization often mitigates the impact of the loss of human capital by recruiting new individuals. March (1991), for example, argues that a moderate level of turnover and replacing departing members with new recruits engenders further exploration. Bringing in individuals not yet socialized into the organizational norms and values and not yet exposed to existing practices and routines fosters exploratory search and eventually creation of new knowledge.

In this study, we draw from theories on structural inertia, organizational learning, evolutionary economics and social capital. Although through different theoretical lenses, all these theories share the basic idea that an organization can be conceived of as bundles of routines. Routines consist of previously learned patterns of action and express what is regular and predictable conduct (Nelson and Winter, 1982). They embody organizational knowledge and memory. Since routines ensure the efficient and smooth functioning of an

organization, any disruptive event that unravels existing bundles increases the risk of organizational dissolution (Amburgey, Kelly and Barnett, 1993).

In their 1984 article, Hannan and Freeman have argued that organizations strive towards consistency of replication and high levels of reliability and accountability to withstand the negative selection of the environment. As organizations evolve over time, and enhance their practices, routines become well established and acquire further consistency. The institutionalization of organizational structures, processes and routines renders them taken-for-granted and widespread, thus conferring legitimacy. Stable and reproducible routines are in fact the foundation of reliable performance. Since the ability to reproduce a structure with high fidelity strengthens resistance to change, structural inertia is the end result of selection. Yet, organizational turnover can seriously weaken this ability and even undermine the long-term viability of a firm. Pressures against turnover, therefore, stem from the path-dependent nature of organizational learning. Organizational learning tends to be incremental and anchored in routines that evolve only gradually over time in response to the degree to which outcomes conform to predefined aspiration levels (Levitt and March, 1988; March, 1994).

Similarly, Nelson and Winter (1982) have highlighted the disruptive effects triggered by organizational turnover. In particular, they maintain "the memories of individual organization members are a primary repository of the operational knowledge of the organization. Some part of the information thus stored may be readily replaced if the particular member storing it leaves the organization … But in some cases the memory of a single organization member may be the sole storage point of knowledge that is both idiosyncratic and of great importance to the organization" (1982: 115). Although organizational memory does not coincide with individual memory, the latter constitutes the primary organizational repository of operational knowledge, particularly long-tenured individuals who are highly instrumental in retrieving information and knowledge (Walsh and Ungson, 1991). As knowledge is often tacit, the "loss of an employee with such important idiosyncratic knowledge poses a major threat to the continuity of routine – indeed, if the departure is unanticipated, continuity is necessarily broken" (1982: 115). The continuity of routines is seriously undermined when, like in the case of personnel turnover, established patterns of activity are jolted and an organization is unable to keep things under control. Besides the level of tacitness of the knowledge a newly hired individual has to assimilate, such continuity in turn depends on "the degree to which experience during the training period is representative of the full job, and – importantly –

whether the incumbent really wants to succeed in imparting the knowledge to its successor" (Nelson and Winter, 1982: 116-117).

Furthermore, organizational turnover erodes the firm's social capital, and this too might trigger organizational dissolution. By social capital we do not simply mean the "supporting relationships with other economic actors, most notably, potential clients" (Pennings, Lee and van Witteloostuijn, 1998: 426), but also the web of internal relationships among individuals (and groups of individuals) within a given organization. This concept pertains to linkages among actors inside and outside the organization, and is consistent with that proposed by Nahapiet and Ghoshal (1998).[1] Organizations endowed with social capital have superior access to valuable resources and are likely to exhibit superior performance (Burt, 1992). Research on social networks has indeed demonstrated how internal ties significantly improve the outcomes of an organization's problem-solving activity (Hargadon and Sutton, 1997; Argote, 1999; Hansen, 1999).

Just as internal relationships (e.g., among organizational members) provide resources in the form of collectively shared skills and complementary knowledge pools, so do external relationships. External contacts are among the organization's most valuable resources (Burt, 1992). Although true in general, particularly in service industries the

success of an organization hinges on the ability to deliver high-quality services and to attract and retain clients (Pennings, Lee and van Witteloostuijn, 1998). *Ceteris paribus*, new clients will choose a firm on the basis of previous interpersonal relationships with its professionals. Organizations benefit from members endowed with valuable social capital (Coleman, 1988; Uzzi, 1996). Thus, the loss of human capital due to organizational turnover produces a loss of social capital as well. The migration of individuals alters webs of social relationships, both internal and external, and has potentially harmful consequences for the firm. This applies *a fortiori* to partnerships, which are the dominant organizational form in this industry. The effect of losing access to valuable resources through such individuals' social networks and relations (Lin, Burt and Cook, 2001) is even stronger when human and social capital spill over to peer firms – which intensifies competition for scarce resources. Although new recruits can endow a firm with new valuable social capital, such contacts need to be properly harmonized with pre-existing ones. Furthermore, as turnover often reveals "low levels of social integration or attachment to fellow group members" (Sørensen, 2001: 4), allegiance to the organization decreases. Loss of social capital should therefore manifest higher odds of dissolution.

In brief, the survival of an organization, especially in service industries, hinges on the ability to preserve the internal ties through which organizational members share skills and knowledge, and the external ties that enhance their ability to attract and retain clients (Smigel, 1969; Maister, 1993), as social relationships with clients mediate economic transactions (Granovetter, 1985). As indicated in Figure 1, the migration of organizational members raises the risk of organizational dissolution, directly, by unraveling existing routines; indirectly, by causing a loss of valuable human and social capital. This leads to the following hypothesis:

Hypothesis 1: Organizational turnover increases the chance of organizational dissolution.

The Organization and the Environment

Besides the disruptive effects due to individual departures, turnover also raises the risk of organizational dissolution by triggering changes in ecological conditions. Although different types of turnover can be observed – organizational members become either unemployed, retire or find employment in other industries – in evolutionary terms the implications are most interesting when such members join a competitor or found a new venture within the same industry. Organizational turnover represents one of the avenues

through which skills and knowledge (human capital) become transferred spatially and temporally. Similarly, not only do individuals migrate from organization to organization, but also pre-existing relationships with clients often follow similar migratory patterns – especially if within the same local market. Movements of employees in the geographical proximity of the firm amplify the consequences of a loss of human and social capital as well as the disruption of existing routines. The harmful effect of organizational turnover is stronger when it occurs locally and entails the creation of a new firm. Several empirical studies have shown how an increase in density produces stronger competitive pressures on neighboring organizations than on more distant ones (Baum and Haveman, 1997; Lomi, 1995; Sørenson and Audia, 2000). By re-shaping these features through the reallocation of critical resources among existing players (e.g., an individual joining an existing organization) or the emergence of new players (e.g., an individual starting up a new organization), organizational turnover shall be seen as a key factor of industry dynamics.

Drawing from research on spatial heterogeneity, we argue that a deeper understanding of the link between macro (population) and micro (organization and individual) evolutionary processes, and their interaction over time, can be attained by examining such processes at a less aggregate level. Populations of organizations are hardly

homogeneous entities: geographical factors produce organizational heterogeneity. The study of the relation between geography and organizations has a long tradition that traces back to the early work of Park (1926), Hawley (1950) and McKenzie (1968). According to these authors human activities tend to assume an orderly arrangement in space, which ultimately leads to the formation of 'human ecologies' whose boundaries are spatially or geographically delimited. Although these boundaries evolve – and even disappear – over time, the 'geography' of localized populations generally comprises "a patchwork of local areas differentiated from one another by cultural, racial, or linguistic peculiarities" (McKenzie, 1968: 73). Human ecologists were among the first to argue that network ties emerge among actors who are spatially co-located (Park, 1926; Hawley, 1950), perhaps because the costs of social interaction increase with geographical distance (Lazersfeld and Merton, 1954).

Spatial considerations have gained a prominent place in the theorizing on organizational ecology. In their study of the American brewing industry, Carroll and Wade (1991) claim that processes of legitimation and competition vary by geographic location. Recently Greve (2000), in his study of the Tokyo banking industry, has shown how the evolution of a population of organizations within a given geographical area is primarily shaped by the variation in density of a more narrowly defined geographical area. The

effect of density is generally stronger at local than non-local levels because both legitimation and competition are proportional to the degree of physical proximity among organizations (Baum and Mezias, 1992; Hedstrom, 1994). Furthermore, geographical differences across markets mirror differences in social structures and innovation (Almeida and Kogut, 1999; Saxenian, 1994). Therefore, different geographical areas can be assimilated to distinct ecologies each bearing a given resource pool and featuring a distinct selection environment.

In sectors like the professional services with a preponderance of personal (i.e., based on trust and reputation) and local (i.e., embedded in the existing social fabric) relationships, the survival of an organization is primarily – though not exclusively – geared to garnering locally available resources. Firms access and retain such resources by offering customized services and adapting their practice to the special needs of local clients (Maister, 1993; Porter, 1980). Over time organizational members can even become the confidant of clients and strong personal ties often ensue. When organizational members migrate within the same geographical area, therefore, defecting clients face lower switching costs: they can readily move with the departing professional. His firm, therefore, ends up with losing valuable human (e.g., individual skills and knowledge) and social (e.g., relations with clients) capital to a peer firm, both competing for the same

scarce resources (e.g., talented professionals and clients). By contrast, since competition tends to be local, the survival of a firm is less likely at stake when organizational members migrate beyond the boundaries of a given geographical area. We then hypothesize:

Hypothesis 2: The impact of organizational turnover on organizational dissolution is stronger when the migration of individuals occurs within the same geographical area.

Turnover may increase the risk of firm dissolution. However, such risk is higher when organizational turnover produces *core* rather than *peripheral* changes in firm attributes (Hannan and Freeman, 1984; Amburgey, Kelly and Barnett, 1993). In her study of small firms in the early telephone industry, for example, Haveman (1993) has shown how the succession of a president – generally a more powerful actor – had a stronger impact on the rate of organizational mortality than the succession of other managers. In the present context, the harmful effects of turnover vary depending on whether a *partner* or an *associate* exits the firm. In professional service organizations, the partners' (e.g., the owners') human capital is more pertinent to the organization's profit potential than that of the associates. As Pennings, Lee and van Witteloostuijn (1998) point out, partners, as residual claimants, have a greater incentive to use their human capital for the growth and

the performance of an organization than do associates. Ownership comes with intangible property rights and diminishes a partner's propensity to leave. Partners face higher exit barriers. Not only do they have more business experience, but they also interact more closely with clients. While partners almost always exit voluntarily, the firm usually terminates associates when they cannot complete the tournament to partnership.[2] Furthermore, a partner's departure triggers a demographic shift in the firm's ownership structure. In short, they are more critical for a firm's performance and survival as they have greater influence on organizational outcomes (Hambrick and Mason, 1984; Sørensen, 2001). Whereas the loss of associates' human and social capital might be disruptive, it should be less disruptive than that of partners. Therefore, professional mobility should be decomposed into movements that involve partners versus those that involve associates. Since we assume geography (spatial heterogeneity) to moderate the influence of turnover on organizational dissolution, such movements are supposed to be more detrimental to the firm if they occur within rather than across different geographical areas. This leads to the following hypothesis:

Hypothesis 3: The impact of organizational turnover within the same geographical area or across different geographical areas on organizational dissolution is stronger when it involves partners rather than associates.

Hypotheses 2 to 3 refer to the case in which an individual joins another organization – whatever its geographical location. Organizational turnover affects the environment surrounding the focal organization through the reallocation of critical resources among organizations competing in the same limited space (Aldrich, 1999). A different case exists whenever a new venture emerges in the focal organization's proximity. Besides the loss of skills, knowledge and clients, an increase in local density – due to organizational founding and then increased competition for the very same scarce resources – also occurs. The survival odds change over time by virtue of organizational turnover producing new competitors. By contrast, if a new firm is founded in a different province, the survival chance of the focal firm is unlikely to change, as local ecological conditions do not necessarily generate a contemporaneous increase in competitive pressures. This produces the following hypothesis:

Hypothesis 4: The risk of organizational dissolution is higher when organizational turnover results in the creation of new organizations within the same rather than a different geographical area.

With Hypotheses 2 to 4 we aim to reconcile macro and micro evolutionary processes and to show their mutual relevance. Individual level phenomena, such as organizational members leaving an existing firm, trigger population dynamics, i.e. phenomena at a

higher level. Again, Figure 1 summarizes the key points of the previous discussion. The effect of turnover on firm dissolution is moderated by locational factors and the status (partners vs. associates) of defecting members.

DATA

The data we use in this paper are similar to those that Pennings, Lee and van Witteloostuijn (1998) analyze in their study of the effect of organization-level changes in human and social capital on organizational dissolution. Data consist of information about individual professional accountants and individual organizations, and were collected from the membership lists (or directories) of accountant associations with one- to five-year intervals. The database records observations on each identified firm approximately every two years, covering a total of 110 years in 53 observation points (to be more precise the percentage of our gaps are 1year: 24%, 2years: 60%, 3years: 6%, 4years: 8%, 5years: 2%). These lists provided information on the name, address, background education and status (partner or associate) of each professional accountant within the association. We reconstructed the histories of individual organizations by first aggregating individual level data to that of the firm. The data cover the entire population of Dutch accounting firms during the period 1880-1986. The complete industry

comprised 1920 firms over the 106-year period. Choosing one industry as our research setting reduces unobserved heterogeneity at the firm level.

Dissolution in this paper is consistent with that proposed by Boone, Bröcheler and Carroll (2000) who define it as exit from the market. Our choice is motivated by the fact that "failure, in the sense of bankruptcy, cannot be observed in the audit industry and, therefore, cannot be distinguished from other types of exit" (2000: 368). Thus, organizational dissolution encompasses different types of exit, ranging from the case where a single proprietorship vanishes as its owner is no longer listed in the C.P.A. directories, to the case of dissolution by acquisition (but the professional accountants of the acquired organization keep working under the acquiring organization), to the case of dissolution by merger between two or more organizations.[3] The notion of organizational dissolution we use in this paper explains why the final number of firms differs from that of Pennings, Lee and van Witteloostuijn (1998). Furthermore, since our observation period ends in 1986, our final population is also smaller than that examined by Boone, Bröcheler and Carroll – whose study extends till 1992.

We chose the "province" to test the hypothesis on spatial heterogeneity. We divided the overall population of accounting organizations into 11 sub-populations – each

corresponding to a different province of The Netherlands. We assumed that they represent a distinct selection environment. Provinces in The Netherlands are important administrative and political units (see Lee and Pennings, 2002; Boone, Carroll and van Witteloostuijn, 2002). Roughly comparable with respect to many resource dimensions, the provinces have clear and distinguishable local identities. For instance, some provinces are predominantly Protestant while others are mainly Catholic. Due to their small size, many organizations compete at the local (province) level and their critical resources (talented professionals and new clients) are local as well. Furthermore, the capital investments to start up a new venture are low. The accounting service industry is in fact "entirely a personal service industry" (Benston, 1985: 47). Figure 2 illustrates its evolving fragmented character during the window of the present study. Concentration of the industry was measured by using the relative market share of the four largest firms (*C4*) over the period 1880-1986. Therefore, although some firms have over time expanded the scope of their activity beyond the provincial boundaries, the province still ought to be considered the relevant environment for most of the firms.

Starting in the late 1960s, the Dutch accounting service industry has witnessed several fundamental regulatory changes. Because of more stringent requirements – for example, the need for higher levels of education and experience, and the examination to become

C.P.A. – the entry of potential competitors has been restricted. Small firms appear to be most disadvantaged by the costs imposed by regulations. The industry has indeed evolved from being virtually unregulated to being extensively regulated. In particular, four major regulatory changes have encompassed both the supply and the demand of professional accounting services. In 1966, with the Law on Registered Accountants, one professional organization or NIvRA (Nederlands Instituut van Register Accountants) was created. Since then, every professional accountant in public practice has become one of its members. The organization has the right to establish disciplinary rules and grant the Registered Accountant (RA) license. The license is granted on condition that a prospective auditor acquires "knowledge of complicated audit techniques (such as statistical sampling, risk analysis and analytical review) and extensive knowledge of financial accounting (measurement methods, regulations and standards)" (Maijoor and van Witteloostuijn, 1996: 555). The regulation has then greatly contributed to the enhancement of the quality of human capital within the industry. Rules of conduct for auditors were prescribed with the Professional Code of Registered Auditors in 1972.

As to the demand side, in 1970 the Act on Annual Accounts of Companies (which took effect in 1971) enlarged the number of firms required by law of disclosing audited annual accounts. In addition to 'open' public companies, large private firms and cooperative

societies were also included. Finally, in 1983 the number was further enlarged with the Title 8 of Book 2 of the Civil Code: every company, public or private, and every cooperative society was forced to disclose audited annual accounts. After the promulgation of definitive guidelines in 1984, the obligation remained less compulsory for small and medium-sized firms that were "allowed to submit abridged annual accounts" (Boone, Bröcheler and Carroll, 2000: 366). By forcing demand for audit services (auditing and disclosure requirements), the 1970 and 1983 regulations have contributed to enhancing even more the value of human capital. While raising the entry barriers into the profession, in fact, these regulations have also fostered the demand for auditing services by increasing the number of firms requiring such services. As human capital has become a scarce resource, the retention of talents is therefore crucial for the long-term viability of a firm.

INDEPENDENT VARIABLES

We tested Hypothesis 1 by creating a time-varying variable – *Turnover* – by taking the logarithm of the number of professional accountants that left the focal firm in a given year.[4] We logged the variable because, as other studies, we assume that the impact of the number of departing members would increase at a decreasing rate (e.g., Rao, Greve and

Davis, 2001). While certain levels of turnover are associated with certain disruptions, the defection of the very first member is likely to be much more dramatic in jeopardizing the integrity of professional partnerships. Partners embody a cohesive group, with a strong *ésprit de corps* where admission occurs only after a lengthy 10-12 year tournament. A walk-out is profoundly disturbing and might expose a larger fissure and an erstwhile stable structure becomes a house of cards. In their study of turnover Krackhardt and Porter have suggested that the defection of one's confidant often engenders a 'snowball effect' on the premise that "the effects of turnover on stayers will not be uniformly nor randomly distributed among the stayers in the organization. Rather, these effects will be localized and focused on those stayers who are closest to those who left. The social network, then describes the topology of forces that reverberate throughout an organization when someone leaves" (1985: 246). It is therefore plausible to argue that the first defection is much more harmful for a partnership compared to subsequent defections that are often triggered by the very first one. That is why we assign disproportionate more weight to initial exits. The disproportionate effect of the first mover can be dramatized with a twisted metaphor: the very first person breaking the partners' truce has an undue influence on its aftermath (Nelson and Winter, 1982).

A potential problem in our analysis is the direction of causality. Turnover might be an effect rather than a cause of organizational dissolution as individuals are more likely to quit their job when their firm is performing poorly and then "death is sneaking around the corner" (see Wagner, 1999). To get around this issue, we lagged the variable by one period to "ensure exogeneity with respect to the dependent variable" (Swaminathan, 2001: 1176). Since in our data a period ranges from a one- to a five-year interval (for 76% of the firms in our database one-period lag corresponds to 2 to 5 years), the one-period lag allows controlling for the risk of reverse causality. Furthermore, since several firms in our sample are single proprietorships (size = 1), in the absence of replacement the departure of the owner of the firm amounts to organizational dissolution. We then restricted our analysis to those individual firms where the departing individual is replaced with a new one (ex: the son who follows into the father's footsteps). In other words, we look at those cases where turnover does not sanction the outright end of a firm's professional activity, but the replacement ensures its continuity at least for a while. We also estimated all models restricting the analysis of the impact of turnover only to firms with size > 1. Though not reported, the results are qualitatively similar to those presented in the paper.

Besides retiring, becoming unemployed or even abandoning the industry, departing individuals can join a competitor or start up a new venture. Since our analysis is primarily concerned with the last two cases, we focused only on the movements of individuals that remained in the industry after leaving their firm. Therefore, the organizational members who join a competitor or found a new firm are only a subset of all defecting individuals. In keeping with research on spatial heterogeneity, we distinguished between movements of professional accountants within or across provinces (Hypothesis 2). In particular, we created two variables – *MemberExit-within-Province* and *MemberExit-across-Provinces* – that measure how many individual C.P.A.s each year start working for another organization – whether already existing or newly founded – within the same province or a different one, respectively. Following the aforementioned reasoning, we expressed them in logarithmic form.

Furthermore, we split the previous two variables into four variables – namely, *PartnerExit-within-Province* and *PartnerExit-across-Provinces*, *AssociateExit-within-Province* and *AssociateExit-across-Provinces* – to distinguish between movements that involve partners and those that involve associates (Hypothesis 3). These new variables – again expressed in logarithmic form – measure the number of partners and associates that

each year left the focal company to join a competitor within the same province or a different one.

The migration of professional accountants does not simply entail joining another organization. New organizations may be founded as well (Hypothesis 4). We then created a dummy variable – *Start-ups-inside-Province* – taking on the value of 1 whenever one or more professional accountants left an existing organization to start up a new venture within the same province, otherwise 0. By contrast, for the case in which new firms are founded in a different province we added a dummy variable – *Start-ups-outside-Province* – taking on the value of 1 when one or more professional accountants left an existing organization to start up a new venture in a different province, otherwise 0. Both variables are dummies, not continuous variables, because we are not interested in the number of newly founded firms per se. Rather, we want to pinpoint every time turnover leads to the formation of a new firm either inside or outside the focal province. The actual number of newly founded firms – as a result of turnover or otherwise – is in fact accounted for by using density at national and provincial levels as control variables (see below).

CONTROL VARIABLES

As the history of the Dutch accounting service industry has been marked by many important historical events that might well account for organization dissolution in specific years, in our models we included several control variables. In particular, we sought to disentangle exogenous forces of evolutionary change, which are discernable at either the national or the entire industry levels (e.g., worldwide conflicts or changes in the institutional environment, etc.), from endogenous forces of evolutionary change that, on the contrary, operate at a lower level (e.g., movements of professional accountants).

Two dummies were created for governmental regulation dealing with *World War I* conditions during 1914-1918 and for the occurrence of *World War II* (1941-1946). The government *Regulation of 1929*, in the wake of the Great Depression, was presumed to be most impactful during 1929 and 1930 (1 if year = 1929 and = 1930, 0 otherwise). Another institutional event was the emergence of a *Single Association* (or NIvRA), which represented the collective interests of all Dutch accounting organizations and was established in 1966 (1 if year > 1966, 0 otherwise). The effect of the regulatory changes enforced in 1971 and 1984 – which significantly heightened the demand for audit services – was captured by two dummy variables, namely *Regulation of 1971* (1 if year >

1971) and *Regulation of 1984* (1 if year > 1984). We used the rate of unemployment (*Unemployment*) – a time-varying variable measured at the national level – to control for some of the circumstances under which the migration of professional accountants is more/less frequently observed. We tried to estimate the extent to which more general phenomena affect the creation of new organizations (e.g., bandwagon effect) with the inclusion of density at the national level – *National Density* – and at the provincial level – *Focal-Province-Density*. A measure of the level of concentration of the industry – *C4*, e.g., the total market share of the top 4 firms – was also included to control for the impact that the number of organizations populating the industry has on organization dissolution. In the presence of high levels of concentration, just a few organizations control most of the available resources (Bain, 1956; Porter, 1980). But the risk of dissolution might also be influenced by how many firms were created or disappeared each year – which is a reflection of the degree of munificence of the environment. We then included two variables – *BirthTotal* and *DeathTotal* – that measure the number of firms founded and dissolved nationwide the previous year, respectively.

To control for spatial heterogeneity at the province level, we created three variables. The first is given by the number of inhabitants in each province – *Provincial Inhabitants* – a time-varying variable deemed to capture variations in carrying capacity (e.g., number of

potential clients). The other two variables – *BirthProvince* and *DeathProvince* – control for the number of firms founded or dissolved the previous year within a given province, respectively. The considerations made before for likewise variables nationwide do still hold in this case.

Several control variables were also created at the organization level. We controlled for the Leverage ratio – *Leverage* – namely the number of associates per partner for each year. According to Maister (1993), when the ratio is high there are fewer career opportunities and then higher levels of turnover. Young talented professionals are in fact likely to seek new job opportunities elsewhere. We measured organization size – *Size* – by taking the logarithm of the number of accountants associated with an organization each year. Large organizations provide associates with more career opportunities and by implication are more likely to retain talented professionals. Following the reasoning of Amburgey, Kelly and Barnett (1993), we also constructed a duration clock variable recording the time elapsed since the last organizational exit – *Time-since-last-Exit* – whatever the nature of that exit (e.g., migration of professionals within the same province or across different provinces). The value of the clock is 0 until the occurrence of a change in which case the clock records the time elapsed before any previous exit. The clock is then reset again to 0 to record the time elapsing prior to any new change. Time is

measured in years since an event. When the clock is reset to 0 the hazard rate increases. Yet, as the time goes by the hazard rate should diminish. As for individual firms the exit of the owner also implies organizational dissolution, we created a dummy – *Single proprietorship* – taking on the value 1 if size = 1 and 0 otherwise. Finally, we controlled for organization age – *Age* – that is, the number of years elapsed since the founding of an organization. Because of their lack of external legitimacy, such firms often experience higher levels of liability of newness (Singh, Tucker and House, 1986). Yet, even older organizations often need to withstand the harmful effects of disruptions in deeply embedded routines (Hannan & Freeman, 1984; Barron, West and Hannan, 1994). Finally, we sought to estimate the role of experiential knowledge and the duration of the relationships with clients at the firm level by creating *Local Experience*, a time-varying variable given by the logarithm of the sum of the number of years each professional accountant has been working for an organization in the province until the observation year. Table 1 reports the pairwise correlation coefficients of the variables we use in our model. In the Appendix we also provide a summary description of all variables used in estimating our models.

MODEL AND METHOD

In building the dataset, we considered the year in which the organization appeared for the first time on the Register of Accountants as the founding year, whereas the last year appearance as the year of dissolution of the same organization. We divided the life of each organization in organization-years (Allison, 1984; Tuma and Hannan, 1984). The final dataset includes the life of 1920 firms divided into 17,491 year-segments. For the analysis we used event history techniques. Our dependent variable is the instantaneous rate of transition from survival to dissolution, defined as:

$$r(t \mid X[t]) = \lim_{\Delta t \to 0} \frac{\Pr(t + \Delta t > T \geq t \mid T \geq t)}{\Delta t}.$$

Different functions of time and different covariates can be used to model the hazard rate of each organization. Given the inconsistent findings on parametric formulation of the rate of age-dependence, a less restrictive way to model it has been recently suggested (Barron, West and Hannan, 1994). For this reason, we chose to use a flexible model, the *piecewise exponential*, which allows the rate to vary in an unrestricted fashion from one

interval to the other at pre-selected ages. More precisely, the age of an organization is divided into intervals and the hazard is constant within each interval but can vary across them. We define a set of J intervals, dividing the age variable at precise points (a_1, a_2, a_3, a_4… aj), where $a_0 = 0$ e $a_j = \infty$. The interval J is given by [a_{j-1}, a_j) and the hazard of the firm i is defined by:

$$r(t) = \mu_j \exp[\beta' x], \quad \text{per} \quad a_{j-1} \leq a < a_j$$

or

$$\log r_1(a) = \alpha_j + \beta' x_i$$

where $\alpha_j = \log \mu_j$. This formulation allows the intercept of the *log-hazard function* to vary at different cut-points (Allison, 1995). Our choice of the intervals was driven by the principle of equal number of observations for each category. We then divided the age of the firm in the following six segments: Age1 (0.5-3 years), Age2 [3-6 years), Age3 [6-10 years), Age4 [10-16 years), Age5 [16-29 years) and Age6 (29-onward years). As already pointed out, the covariates were lagged by one period to avoid problems of simultaneity. We estimated the hazard rate of the organization i at the age a – namely $r_i(a)$ – as a

function of a vector of firm characteristics, **w**, and of a vector of environmental variables measured at different levels of analysis, **z**, using the following model:

$$r_i(a) = \mu_j(a) \cdot \exp[\, \varphi' w_{ia} + \gamma' z_{ia} \,],$$

We chose a model of continuous representation of the events to highlight the continuity of the social processes behind the dissolution of an organization.[5] As some of the models described in the next section are not nested, following Lomi (1995), we compared them using the $\bar{\rho}^2$ statistics (Horowitz, 1983). The $\bar{\rho}^2$ test for model specification is a likelihood ratio test adjusted to account for differences in degrees of freedom across non-nested models and is defined as follows:

$$\bar{\rho}^2 = 1 - \frac{L_f - \eta_f}{L(0)}$$

where $\mathbf{L_f}$ is the log-likelihood of the full model, $\boldsymbol{\eta_f}$ is the number of parameters, and $\mathbf{L}(0)$ is the log-likelihood of the restricted model containing a constant term only. The model with the highest $\bar{\rho}^2$ value is the one that best fits the data. We introduced fixed effects

at the province level to account for systematic geographical differences in dissolution propensity. Lastly, all the estimates were obtained using Maximum Likelihood estimation method using version 7 of STATA.

RESULTS

Table 2 presents the maximum likelihood estimates for piecewise exponential models of organizational dissolution. Model 1 includes all the control variables. In Model 2, we added the variable *Turnover* to test Hypothesis 1. In Model 3, we introduced the variables *MemberExit-within-Province* and *MemberExit-across-Provinces* to test Hypothesis 2. In Model 4, we replaced the previous two variables with *PartnerExit-in-Province*, *AssociateExit-in-Province*, *PartnerExit-across-Provinces* and *AssociateExit-across-Provinces* to test Hypothesis 3. Finally, in Model 5, we tested Hypothesis 4 by including the variables *Start-up-inside-Province and Start-up-outside-Province.*

The baseline model (Model 1) with all control variables shows that the government regulations following the 1929 crisis affected the risk of organizational dissolution. Whereas the creation of the single association (NIvRA), the regulatory measures taken to withstand the occurrence of *World War II* and the boost in the demand for auditing

services caused by the 1984 regulation raised such risk, the others reduced it. The level of industrial concentration (*C4*) is in the expected direction but it is non-significant. Moreover, the effect of the dummies related to the *Age* variable suggests the existence of a curvilinear effect between age and failure: accountant firms are more likely to dissolve either when they are very young or when they become old. Although not presented here, we also estimated a model including a curvilinear specification for age, but the model exhibited a lower fit with the data.

First partial support for the spatial heterogeneity hypothesis can be found in the coefficients estimates of the variables measuring the impact of ecological variables on failure rates, namely the number of firms born (*BirthProvince* and *BirthTotal*), and dissolved (*DeathProvince* and *DeathTotal*) during the previous year within the same province and nationwide, respectively. Although the coefficients for densities are not significant, the estimate obtained by measuring the impact of organizational births locally is roughly two times that obtained at the national level; by the same token, the impact of dissolutions at the provincial level is significant and five times greater than that of organizations dissolved at the national level. Qualitatively these results suggest that the survival chances of the focal organization are associated with the evolutionary (vital) dynamics of local populations. In a similar vein, greater experiential knowledge of the

geographical area (*Local Experience*) enables a firm to more effectively cope with the disruptive consequences induced by organizational turnover.

The estimates obtained for the coefficient of the variable *Turnover* support our Hypothesis 1 (Model 2). A turnover event significantly raises the risk of organizational dissolution. As the estimates suggest, when 5 members leave their firm, for example, the hazard rate of organizational dissolution increases by approximately 22% [exp(0.126*ln(5)]. Mirroring the results founded by Amburgey, Kelly and Barnett (1993) on the effect of organizational change, our study provides evidence on the curvilinear relationships between professionals' exits on firm dissolution: the deleterious consequences of this event decrease over time (*Time-Since-Last-Exit*) until it reaches a minimum threshold, after which the organization is unable to withstand new exits – as shown by its quadratic effect.

Model 3 provides support for Hypothesis 2. The risk of organizational dissolution increases when turnover translates into the migration of professionals from firm to firm within the same province or outside. Adding these two variables improves significantly the fit of our model ($\chi^2[L_7 \mid L_6] = 167.1$ with 2 d.f.). The coefficients of the variables measuring these movements – *MemberExit-within-Province* and *MemberExit-across-*

Provinces – are both highly significant and in the expected direction. Yet, the migration of professionals has a stronger effect when it occurs within the same province than when it occurs outside it [χ^2=5.68 p<.05 with 1 d.f.]. As the estimates suggest, when 5 members leave their firm to join a competitor within the same geographical area, for example, the hazard rate of organizational dissolution increases by approximately 19% [exp(0.11*ln(5)]. Interestingly, this formulation of the model amplifies the effect of the size variable, significantly increasing the beneficial consequences of it on organizational dissolution. We interpret this result as related to the superior ability of bigger firms in managing professionals' migrations.

In Model 4 we distinguished between movements involving partners and movements involving associates. Consistently with Hypothesis 3, the risk of organizational dissolution is much higher when partners leave the focal firm to join a competitor, especially if the latter is located within the same geographical area [χ^2=5.10 p<.05 with 1 d.f.]. This suggests that an important part of the increment in the risk of organizational dissolution (19% for 5 exits – see above) is captured by the movements of partners joining a firm within the same geographical province [exp(0.10*ln(5)=17%]. By contrast, only when associates join a competitor located in the proximity of the focal firm does the risk of organizational dissolution increase, although the coefficient is significant only at

0.10. It is also worth noting that the impact of movements of associates is by far smaller than that of partners, as indicated by the difference in magnitude of the coefficients of the variables measuring such movements (.081 vs. .038).

Model 5 further confirms the spatial heterogeneity hypothesis. Organizational turnover leading to the creation of a new firm within the same province significantly increases the hazard of dissolution. The coefficient of the variable *Start-ups-inside-Province* is highly significant and in the expected (positive) direction (Hypothesis4). By contrast, the coefficient of the variable measuring the impact of starting a new venture in a different province (*Start-ups-outside-Province*) – though is in the opposite direction to what we were expecting – is only marginally significant ($p < 0.1$). Besides the potential loss of valuable human and social capital, and the disruption of existing routines, in fact, the survival chance of the focal organization is also harmed by the increase in local density. Higher levels of competition for scarce resources eventually raise the risk of dissolution of any organization located within the same ecological area. Adding these two variables improves significantly the fit of our model ($\chi^2[L_7 \mid L_6] = 150.1$ with 2 d.f.). Interestingly enough, after accounting for the spatial heterogeneous dynamics of professionals' migrations, the estimate obtained for *Turnover* – though still significant – is less than half its initial value (.126 vs. .047).

It is worth noting that the value of the $\overline{\rho}^2$ - used to compare non-nested models – shows that the goodness of fit improves as we add new covariates. In particular, the model with all main effects (Model 5) fits the data better than any other model. Overall, the estimates displayed in Table 2 provide support for all hypotheses.

DISCUSSION AND CONCLUSIONS

In this paper we sought to investigate the local effect of organizational turnover on firm survival. To this end, we dealt with three aspects. First we demonstrated the presence of strong effects of turnover on organizational dissolution. Second, we showed how propinquity is crucial in moderating that effect. Finally we presented a multi-level research design embracing individual, firm and industry factors to more fully understand the dynamics within and across these levels.

Organizational turnover has been described as a disruptive event that augments the risk of firm dissolution. Exit of professionals is indeed highly damaging for professional services firms. Professional services firms compete not only for clients, but for human capital as well. Their social capital is likewise tied up with their current roster of

professionals and becomes compromised when some of them leave. The complex, shared routines around work, governance and socialization might become unraveled, requiring the firm to reset their learning clock (Lee and Pennings, 2002). The deleterious effect of professional exit is most damaging to the firm when it unfolds at the local level and involves partners rather than associates. The exodus of professionals to remote firms is not nearly as profound as is the exodus to proximate ones. Most harmful is the exit of professionals who start their own firm within the same geographical area where the original firm is located. Full account of the impact of organizational turnover, therefore, requires a more fine-grained examination of the exit behavior of individuals. These results provide strong evidence of the link between personnel flows to population level processes, which to date has remained largely unexplored (Wade et al., 1999: 136).

The finding that these deleterious effects are largely regional hints at the embeddedness of organizational practices and relationships (Uzzi, 1997). Social networks, whether internal or external, become cultivated locally and transforming them may translate into diminished organizational performance. The exit of professionals very often amounts to jolts, upheavals and other forms of organizational change and discontinuity. Such changes are most paramount when turnover occurs within the focal firm's immediate geographic proximity. In keeping with the hypothesis on spatial heterogeneity,

competition among firms tends to be local. Geography and inter-firm mobility display important main and interaction effects on firm survival. However, other ways to disentangle these relationships may produce even stronger results. For example, the choice of province as a meaningful social entity for uncovering spatially heterogeneous hazard patterns might be questioned. Provinces are administrative units with tenuous boundaries, less so cohesive, well-bounded social communities. Therefore, our results should be much stronger if we had geographically less ambiguous social entities – for example, "conurbation", Statistical Metropolitan Areas (SMAs) or industrial districts. Nevertheless, our study of provinces signals that geography should not be disregarded and that in fact propinquity embodies an important influence of localized learning and inter-firm knowledge transfer.

Our study is primarily concerned with the spatial impact of organizational turnover on organizational dissolution. Yet, the paper provides only an incomplete synopsis of what is obviously a multi-level phenomenon. Individuals who move between firms, engender not only inter-firm learning, but also inflict erosion of "intellectual property" and loss of competitive advantages. Conversely, a firm's shifting contemporaneous density and demographic composition often unleashes movement of professionals across firms.

Therefore, for being an antecedent and an outcome, turnover is worthy of investigation (Sørensen, 2001).

A related question – which our data cannot properly address either – is whether spatial heterogeneity is rooted in contextual or cognitive differences. Distinct geographical areas, for instance, may differ because of institutional, historical, socio-economic reasons that ultimately affect the type and the amount of resources locally available. On the other hand, as Porac et al. (1995) demonstrated, firms are likely to see as competitors those firms that operate in their proximity. This also echoes with our study where firms are small and clients tend to be local. Yet, only a more fine-grained analysis, with qualitative data can shed light on the pre-eminent validity of cognitive explanations. Future research, therefore, may find this question worth exploring.

These results implore us to move towards a joint consideration of macro- and micro-evolutionary processes and to show their interconnectedness. Individual level phenomena (the departure from an existing organization) trigger phenomena at a higher level (organizational and ecological changes) that ultimately create the conditions for the former to come about. In this sense, the results show how turnover is an important endogenous force shaping the evolution of localized populations of organizations. Individuals' choice behavior does not occur in a vacuum. Rather, it is often determined

by availability of vacancy in other occupations and other firms. Population level conditions obviously also play a major role in the market for professional labor (Haveman and Cohen, 1994). During periods of entrepreneurial vigor, high levels of professionals' migrations can be observed, while during spells of gloom and when bankruptcies abound, employees wait and sit out the storm. In short, organizational turnover is partly a function of the current landscape. Likewise, fluctuating rates of firm dissolution and founding produce variations in population parameters, most notably density. And these parameters, in turn, trigger organizational turnover, and so on. Frameworks and analysis strategies for jointly considering different levels should therefore be developed. The present study ought to be seen in a wider context where individual, firm and population or industry level factors figure prominently in the understanding of micro-motives and macro behavior (Schelling, 1978).

The results of our analysis are partly idiosyncratic to the industry. However, we believe they hold also in other professional services sectors such as investment banking, law and consulting. Similar mobility patterns are in fact common in high-tech industries (e.g., software, biotech, semiconductor) where the survival of existing organizations crucially hinges on knowledge-based resources. Similarly, in those industries where reputation plays a critical role (e.g., fashion) organizational turnover may significantly affect the

hazard rate of organizational dissolution. Not surprisingly, firms often strive to retain key employees through fringe benefits, stock options or binding contracts (Doeringer and Piore, 1971; Milgrom and Roberts, 1992).

REFERENCES

Aldrich, H.

1999 Organizations Evolving. London: Sage Publications.

Allison, P.D.

1984 Event History Analysis: Regression for Longitudinal Event Data. Beverly Hills: Sage.

Allison, P. D.

1995 Survival Analysis Using the SAS System. NC: SAS Institute Cary.

Almeida, P., and B. Kogut

1999 "Localization of knowledge and the mobility of engineers in regional networks." Management Science, 45: 905-917.

Amburgey, T., D. Kelly, and W. Barnett

1993 "Resetting the clock: The dynamics of organizational change and failure." Administrative Science Quarterly, 38: 51-73.

Argote, L.

1999 Organizational Learning: Creating, Retaining and Transferring Knowledge. Norwell, MA: Kluwer Academic Publishers.

Argote, L., and R. Ophir

2002 "Interorganizational learning." In J.A.C. Baum (ed.), Companion to Organizations: 181-207. Oxford: Blackwell.

Bain, J.

1956 Barriers to New Competition. Cambridge, MA: Harvard University Press.

Barney, J. B.

1986 "Types of competition and the theory of strategy: Toward an integrative framework." Academy of Management Review, 11(4): 791-800.

1991 "Firm resources and sustained competitive advantage." Journal of Management, 17(1): 99-120.

Barron, D. N., E. West, and M. T. Hannan

1994 "A time to grow and a time to die: Growth and mortality of credit unions in New York City." American Journal of Sociology, 100(2): 381-421.

Baum, J. A. C., and S. Mezias

1992 "Localized competition and organizational failure in the Manhattan hotel industry, 1898-1990." Administrative Science Quarterly, 37: 580-604.

Baum, J. A. C., and H. A. Haveman

1997 “Love thy neighbor? Differentiation and agglomeration in the Manhattan hotel industry, 1898-1990.” Administrative Science Quarterly, 42: 304-338.

Baum, J. A.C., and P. Ingram

1998 “Population-level learning in the Manhattan hotel industry, 1898-1980.” Management Science, 44: 996-1016.

Benston, G. J.

1985 “The market for public accounting services: Demand, supply and regulation.” Journal of Accounting and Public Policy, 4: 33-79.

Boone, C., V. Bröcheler, and G. R. Carroll

2000 “Custom service: Application and tests of resource-partitioning theory among Dutch auditing firms from 1896 to 1992.” Organization Studies, 21(2): 355-381.

Boone, C., G.R. Carroll, and A. van Witteloostuijn

2002 “Environmental resource distributions and market partitioning: Dutch daily newspaper organizations from 1968 to 1994.” American Sociological Review (forthcoming).

Burt, R. S.

1992 Structural Holes. Cambridge, MA: Harvard University Press.

Carroll, G. R., and J. Wade

1991 “Density dependence in the organizational evolution of the American brewing industry across different levels of analysis.” Social Science Research, 20: 217-302.

Castanias, R., and C. Helfat

1991 “Managerial resources and rents.” Journal of Management, 17: 155-171.

Coleman, J. S.

1988 “Social capital in the creation of human capital.” American Journal of Sociology, 94: S95-S120.

Dierickx, I., and K. Cool

1989 “Asset stock accumulation and sustainability of competitive advantage.” Management Science, 35: 1504-1511.

Doeringer, P. B., and M. J. Piore

1971 Internal Labor Markets and Manpower Analysis. Lexington, MA: Health.

Flides, R.A.

1990 “Strategic challenges in commercializing biotechnology.” California Management Review, Spring: 63-72.

Granovetter, M. S.

1985 “Economic action and social structure: The problem of social embeddedness.” American Journal of Sociology, 31: 481-510.

Greve, H.

2000 “An ecological theory of spatial evolution: Local density dependence in Tokyo Banking, 1894-1936.” Working paper, Institute of Policy and Planning Sciences, University of Tsukuba.

Groysberg, B., and A. Nanda

2001 “Does stardom affect job mobility? Evidence from analyst turnover in investment banks.” HBS Division of Research Working paper series 02-029.

Hambrick, D., and P. A. Mason

1984 “Upper echelons: The organization as a reflection of its top managers.” Academy of Management Review, 9: 193-206.

Hannan, M. T., and J. Freeman

1984 “Structural inertia and organizational change.” American Sociological Review, 49: 149-64.

1989 Organizational Ecology. Cambridge, MA: Harvard University Press.

Hansen, M.

1999 “The search-transfer problem: The role of weak ties in sharing knowledge across organization subunits.” Administrative Science Quarterly, 44(1): 82-111.

Hargadon, A., and R. I. Sutton

1997 “Technology brokering and innovation in a product development firm.” Administrative Science Quarterly, 42: 716-749.

Harris, D., and C. Helfat

1997 "Specificity of CEO human capital and compensation." Strategic Management Journal, 18: 895-920.

Haveman, H. A.

1993 "Ghosts of managers past: Managerial succession and organizational mortality." Academy of Management Journal, 36(4): 864-881.

Haveman, H. A., and L. E. Cohen

1994 "The ecological dynamics of careers: The impact of organizational founding, dissolution, and merger on job mobility. " American Journal of Sociology, 100: 104-152.

Hawley, A. H.

1950 "Human Ecology. A Theory of Community Structure." New York: The Ronald Press.

Hedstrom, P.

1994 "Contagious collectives: On the spatial diffusion of Swedish trade unions, 1890-1940." American Journal of Sociology, 99: 1157-79.

Horowitz, J.

1983 "Statistical comparison of non-nested probabilistic choice demand models." Transportation Science, 17: 319-350.

Krackhardt, D., and L. W. Porter

1985 "When friends leave: A structural analysis of the relationship between turnover and stayers' attitudes." Administrative Science Quarterly, 30(2): 242-277.

Lazarsfeld, P.F., and R. K. Merton.

1954 "Friendship as a Social Process: A Substantive and Methodological Analysis." In M. Berger, T. Abel, and C. H. Page (eds.), Freedom and Control in Modern Society: 18-66. New York: Van Nostrand.

Lee, K., and J. M. Pennings

2002 "Mimicry and the market: Adoption of a new organizational form." Academy of Management Journal, 45(1): 144-162.

Levitt, B., and J. March

1988 "Organizational learning." Annual Review of Sociology, 14: 319-40.

Lin, N., K. Cook, and R. S. Burt

2001 "Social Capital. Theory and Research." New York: Aldine De Gruyter.

Lomi, A.

1995 "The population ecology of organizational founding: Location dependence and unobserved heterogeneity." Administrative Science Quarterly, 40: 111-144.

Maister, D. H.

1993 Managing the Professional Service Firm. New York: Free Press.

Maijoor, S., and A. van Witteloostuijn

1996 "An empirical test of the resource-based theory: Strategic regulation in the Dutch audit industry." Strategic Management Journal, 17(7): 549-569.

March, J. G.

1991 "Exploration and exploitation in organizational learning." Organization Science, 2(1): 71-87.

1994 A Primer on Decision Making: How Decisions Happen. New York: Free Press.

McKenzie, R. D.

1968 "On Human Ecology." Chicago: The University of Chicago Press.

Milgrom, P., and J. Roberts

1992 Economics, Organization and Management. New Jersey: Prentice-Hall.

Nahapiet, J., and S. Ghoshal

1998 "Social capital, intellectual capital, and the organizational advantage." Academy of Management Review, 23: 242-266.

Nelson, R. R., and S. G. Winter

1982 An Evolutionary Theory of Economic Change. Cambridge, MA: Harvard University Press.

Park, R.E.

1926 "The Urban Community as a Spatial Pattern and a Moral Order." In E. W. Burgess (ed.), The Urban Community: 3-18. Chicago: University of Chicago Press.

Pennings, J., K. Lee, and A. van Witteloostuijn

1998 "Human capital, social capital and firm dissolution." Academy of Management Journal, 41(4): 425-440.

Porac, J.F., H. Thomas, F. Wilson, D. Paton, and H. Kanfer

1995 "Rivalry and the industry model of the Scottish knitwear producers." Administrative Science Quarterly, 40 (2): 203-227.

Porter, M. E.

1980 Competitive Strategy. New York: Free Press.

Rao, H., H. R. Greve, and G. F. Davis

2001 "Fool's gold: Social proof in the initiation and abandonment of coverage by Wall Street analysts." Administrative Science Quarterly, 46: 502-526.

Rao, H., and R. Drazin

2002 "Overcoming resource constraints by recruiting talent from rivals: A study of recruitment and product innovation in the mutual fund industry 1986-1994." Academy of Management Journal (forthcoming).

Saxenian, A.

1994 Regional Advantage. Cambridge, MA: Harvard University Press.

Schelling, T. C.

1978 Micromotives and Macrobehavior. New York: W. W. Norton and Company.

Singh, J.V., D. J. Tucker, and R. J. House

1986 "Organizational legitimacy and the liability of newness." Administrative Science Quarterly, 31(2): 171-193.

Simon, H. A.

1991 "Bounded rationality and organizational learning." Organization Science, 2(1): 125-134.

Smigel, E. O.

1969 The Wall Street Lawyer: Professional Organization Man? Bloomington: Indiana University Press.

Sørensen, J. B.

2001 "Changes in group composition and turnover: A longitudinal study." American Sociological Review (forthcoming).

Sørenson, O., and P. Audia

2000 "The social structure of entrepreneurial activity: geographic concentration of footwear production in the United States, 1940-1989." American Journal of Sociology, 106: 424-62.

Stumpf, S. A., and P. K. Dawley

1981 "Predicting voluntary and involuntary turnover using absenteeism and performance indices." Academy of Management Journal, 24(1): 148-163.

Swaminathan, A.

2001 "Resource partitioning and the evolution of specialist organizations: The role of location and identity in the U.S. wine industry." Academy of Management Journal, 44(6): 1169-1185.

Tuma, N., and M. T. Hannan

1984 Social Dynamics: Models and Methods. Orlando: Academic Press.

Uzzi, B.

1996 "The sources and consequences of embeddedness for the economic performance of organizations: The network effect." American Sociological Review, 61: 674-698.

1997 "Social structure and competition in inter-firm networks: The paradox of embeddedness." Administrative Science Quarterly, 42(1): 35-67.

Wade, J. B., J. F. Porac, and M. Yang.

1999 "Interorganizational Personnel Dynamics, Population Evolution, and Population-Level Learning." In A.S. Miner and P. Anderson (eds.) Advances in Strategic Management, 16: 131-153. Greenwich: JAI Press.

Wagner, J.

1999 “The life history of exits from German manufacturing.” Small Business Economics, 13: 71-79.

Walsh, J. P., and G. R. Ungson

1991 “Organizational memory.” Academy of Management Review, 16(1): 57-91.

Wernerfelt, B.

1984 “A resource-based view of the firm.” Strategic Management Journal, 5(2): 171-180.

Figure1

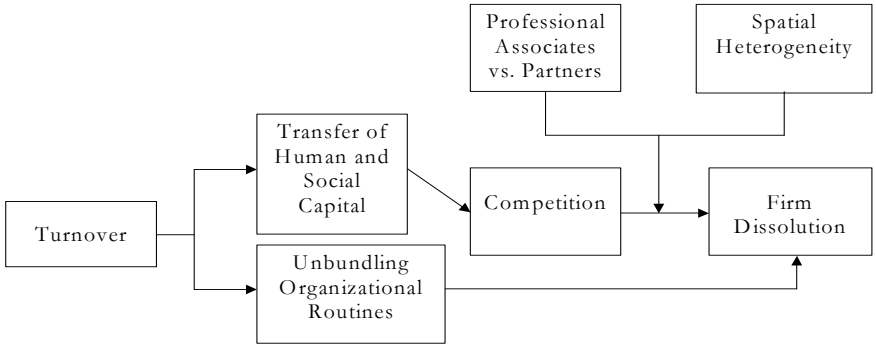

Figure 2. Concentration index of the four biggest firms

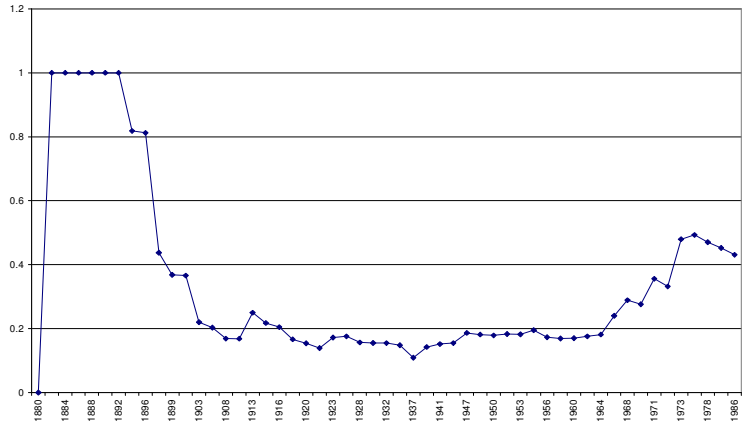

Table 1

Dissolution Rate of Dutch Accounting Firms 1880-1986 using Maximum Likelihood Estimation Method

	Model1	Model1	Model3	Model4	Model5
CONTROLS					
Constant	-1.686 **	-.907 **	-.248	-.220	-.019
	(.306)	(.317)	(.319)	(.345)	(.341)
Age1 (0.5-3)	.433 **	.589 **	.416 **	.418 **	.048
	(.101)	(.105)	(.105)	(.105)	(.110)
Age2 (3-6)	-.255 **	-.137	-.115	-.116	-.200
	(.107)	(.110)	(.111)	(.111)	(.109)
Age3 (6-10)	-.270 **	-.166	-.093	-.093	-.080
	(.109)	(.111)	(.112)	(.112)	(.109)
Age4 (10-16)	-.196 **	-.099	-.043	-.046	-.039
	(.105)	(.107)	(.109)	(.109)	(.106)
Age5 (16-29)	-.212 **	-.138	-.095	-.095	-.085
	(.102)	(.104)	(.107)	(.107)	(.105)
World War I	-.048	-.053	-.040	-.048	-.053
	(.185)	(.185)	(.187)	(.187)	(.185)
Regulation of 1929	-12.244 **	-11.546 **	-11.258 **	-11.269 **	-12.632 **
	(.077)	(.080)	(.078)	(.078)	(.078)
World War II	.319 **	.356 **	.347 **	.343 **	.323 **
	(.120)	(.119)	(.118)	(.118)	(.116)
Single association	.410 **	.394 **	.353 **	.358 **	.384 **
	(.121)	(.123)	(.127)	(.127)	(.130)
Regulation of 1971	-.365 **	-.367 **	-.284 **	-.288 **	-.202
	(.123)	(.123)	(.126)	(.126)	(.130)
Regulation of 1984	.077	.053	-.147	-.140	-.294 **
	(.122)	(.121)	(.122)	(.122)	(.123)
Provincial Inhabitants (in thousands)	-.0001	-.0001	-.0001	-.0001	-.0001
	(.0002)	(.0002)	(.0002)	(.0002)	(.0002)
C4	.226	.196	.119	.102	.190
	(.559)	(.560)	(.635)	(.638)	(.684)
BirthProvince	-.006	-.006	-.008 *	-.007 *	-.008 *
	(.004)	(.004)	(.004)	(.004)	(.004)
DeathProvince	.032 **	.032 **	.031 **	.030 **	.029 **
	(.004)	(.004)	(.004)	(.004)	(.004)
FocalProvinceDensity	.001	.001	-.001	-.001	-.001
	(.002)	(.002)	(.002)	(.001)	(.002)
BirthTotal	-.003 **	-.003 **	-.002	-.002	-.002
	(.001)	(.001)	(.001)	(.001)	(.001)
DeathTotal	.006 **	.006 **	.007 **	.007 **	.007 **
	(.001)	(.001)	(.001)	(.001)	(.001)
NationalDensity	-.001	-.001	-.001	-.001	-.001
	(.001)	(.001)	(.001)	(.001)	(.001)
Unemployment	-.017 **	-.016 **	-.016 **	-.016 **	-.018 **
	(.005)	(.005)	(.005)	(.005)	(.005)
Size (Log)	.061	-.028	-.205 **	-.228 **	-.118 **
	(.051)	(.042)	(.041)	(.044)	(.044)
Single proprietorship	-.211 **	-.244 **	-.209 **	-.233 **	-.453 **
	(.069)	(.067)	(.003)	(.066)	(.075)
Time-since-last-Exit	-.137 **	-.152 **	-.128 **	-.124 **	-.141 **
	(.069)	(.018)	(.017)	(.017)	(.019)
Time-since-last-Exit2	.002 **	.001 **	.002 **	.002 **	.002 **
	(.018)	(.018)	(.001)	(.001)	(.001)
Leverage	.002	.003	.054	.071	.034
	(.062)	(.063)	(.063)	(.064)	(.066)
Local Experience	-.103 **	-.101 **	-.107 **	-.109 **	-.085 **
	(.009)	(.009)	(.009)	(.009)	(.010)

Table 1 (continued - independent variables)

Variables	Model1	Model2	Model3	Model4	Model 5
HYPOTHESIS TESTING VARIABLES					
Turnover (Log)		.126 ** (.013)	.089 ** (.014)	.097 ** (.014)	.047 ** (.016)
MemberExit-within-Provinces (Log)			.107 ** (.011)		
MemberExit-across-Provinces (Log)			.068 ** (.009)		
PartnerExit-within-Provinces (Log)				.101 ** (.011)	.070 ** (.013)
AssociateExit-within-Provinces (Log)				.032 (.019)	.053 ** (.020)
PartnerExit-across-Provinces (Log)				.063 ** (.010)	.065 ** (.013)
AssociateExit-across-Provinces (Log)				.030 (.020)	.030 (.021)
Start-ups-inside-Province		.			.969 ** (.077)
Start-ups-outside-Province					-.241 (.132)
$\overline{\rho}^2$	.9	.10	.11	.11	.12
Log Likelihood	7686.36	7721.43	7804.92	7801.44	7876.51

APPENDIX – VARIABLES DESCRIPTION

1. Socio-economic and Regulatory Conditions

WWI = dummy taking on 1 for the period 1914-1918, 0 otherwise.

Regulation of 1929 = dummy taking on 1 for the period 1929-1930, 0 otherwise.

WWII = dummy taking on 1 for the period 1941-1946, 0 otherwise.

Provincial Inhabitants = yearly number of inhabitants per province.

Unemployment = yearly rate of unemployment at national level.

2.1 National Population Attributes and Regulatory Conditions

Single Association = dummy taking on 1 if year > 1966, 0 otherwise.

Regulation of 1971 = dummy taking on 1 if year > 1971, 0 otherwise.

Regulation of 1984 = dummy taking on 1 if year > 1984, 0 otherwise.

C4 = accounting service industry concentration index.

National Density = number of firms nationwide per year.

BirthTotal = number of firms existing born nationwide the period before the observation.

DeathTotal = number of firms existing dissolved nationwide the period before the observation.

2.2 Provincial Population Attributes

FocalProvinceDensity = number of firms at provincial level in a given year.

BirthProvince = number of firms born at provincial level the period before the observation.

DeathProvince = number of firms dissolved at provincial level the period before the observation.

3. Firm Attributes

Age = number of years elapsed since founding.

Size = logarithm of the number of professionals (partners and associates) per firm per year.

Local Experience = logarithm of the sum of previous years worked by a firm's professionals inside the focal province.

Single proprietorship = dummy taking on the value 1 if size = 1, 0 otherwise.

Leverage= number of associates per partner each year.

Turnover = logarithm of the sum of partners and associates leaving or join the focal firm.

MemberExit-within-Province = logarithm of the number of professionals leaving the firm and joining a firm within the same province (+ .001) each year.

MemberExit-across-Provinces = logarithm of the number of professionals leaving the firm and joining a firm in a different province (+ .001) each year.

PartnerExit-within-Province = logarithm of the number of partners leaving the firm and joining another firm within the same province (+ .001) each year.

AssociateExit-within-Province = logarithm of the number of associates leaving the firm and joining a firm within the same province (+ .001) each year.

PartnerExit-across-Provinces = logarithm of the number of partners leaving the firm and joining a firm within a different province (+ .001) each year.

AssociateExit-across-Provinces = logarithm of the number of associates leaving the firm and joining a firm in a different province (+ .001) each year.

Time-since-last-Exit = number of years elapsed since last exit.

Start-ups-inside-Province = dummy taking on 1 if exit leads to the creation of a new firm within the same province, 0 otherwise.

Start-ups-outside-Province = dummy taking on 1 if exit leads to the creation of a new firm in a different province, 0 otherwise.

FOOTNOTES

[1] They define social capital as "the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit. Social capital thus comprises both the network and the assets that may be mobilized through that network" (1998: 154).

[2] Although our data do not allow us to precisely distinguish cases of voluntary turnover (resignation) from cases of involuntary turnover (dismissal), in general partners interrupt voluntarily their relationship with their firm, while associates are asked to leave (Maister, 1993). For a first empirical investigation of the factors affecting voluntary and involuntary turnover see Stumpf and Dawley (1981).

[3] Since starting in the late 1960s throguh international mergers and acquisitions the Dutch acconting industry has become increasingly concentrated, we checked whether the results might be affected by our notion of dissolution. In particular, we conducted a sensitivity analysis including only the data till the end of the 1960s. The results, which are available from the authors, are qualitatively similar to those presented in the paper.

[4] We estimated the model also expressing *Turnover* in relative terms (i.e., exit rate). Again, the results turned out to be equivalent.

[5] The estimates obtained using a *complementary log-log* model, here not reported, offered values qualitatively similar to those presented in the paper.